

CLAIMS

1. Energy absorber consisting of at least two extruded multichamber hollow profiles (10, 11, 12, 13, 14, 15, 16) made of aluminum or an aluminum alloy, which have a flat profile in cross section with two parallel broad faces (20, 21) and curved or flat narrow faces (22, 23), wherein the multichamber hollow profiles (10, 11, 12, 13, 14, 15, 16) are securely joined to each other along their parallel broad faces (20, 21), characterized in that identical or different multichamber hollow profiles (10, 11, 12, 13, 14, 15, 16) are arranged in succession in the energy absorber (1, 1', 1'', 1''') with their broad faces (20, 21) facing a possible force (F) that may act on them; and in that the multichamber hollow profiles (10, 11, 12, 13, 14, 15, 16) each have a width b and a height h, wherein the ratio of width b to height h is in the range of $b : h = 3 : 1$ to $b : h = 40 : 1$, and in that multichamber hollow profiles (10, 11, 12, 13, 14, 15, 16) are provided with the same and/or different wall thicknesses (d1) of the outer wall (20, 21, 22, 23), where the wall thickness (d1) of the outer wall (20, 21, 22, 23) is in the range of 0.15-3 mm.

2. Energy absorber according to Claim 1, characterized in that the multichamber hollow profiles (10, 11, 12, 13, 14, 15, 16) have at least three chambers (25, 25', 25'') extending in the longitudinal direction of the profile.

3. Energy absorber according to Claim 2, characterized in that the multichamber hollow profiles (10, 11, 12, 13, 14, 15, 16) are provided with the same and/or different numbers of chambers (25, 25', 25'').

4. Energy absorber according to Claim 2 or Claim 3, characterized in that the chambers (25) in the multichamber hollow profiles (10, 11, 12) are separated by flat inner walls (24) that are arranged perpendicularly between the broad faces (20, 21) and extend in the longitudinal direction of the profile, so that rectangular chamber cross sections are formed.

5. Energy absorber according to Claim 2 or Claim 3, characterized in that the chambers (25') in the multichamber hollow profiles (13, 14) are separated by flat inner walls (24, 24') that are arranged perpendicularly and/or obliquely between the broad faces (20, 21) and extend in the longitudinal direction of the profile, so that triangular chamber cross sections are formed.

6. Energy absorber according to Claim 2 or Claim 3, characterized in that the chambers (25'') in the multichamber hollow profiles (15) are separated by curved inner walls (24'') that are arranged between the broad faces (20, 21) and extend in the longitudinal direction of the profile.

7. Energy absorber according to Claims 4 to 6, characterized in that multichamber hollow profiles (10, 11, 12, 13, 14, 15, 16) are provided with the same and/or different chamber cross sections.

8. Energy absorber according to Claim 1, characterized in that multichamber hollow profiles (10, 11, 12, 13, 14, 15, 16) are provided with the same and/or different widths b.

9. Energy absorber according to Claim 1, characterized in that multichamber hollow profiles (10, 11, 12, 13, 14, 15, 16) are provided with the same and/or different heights h.

10. Energy absorber in accordance with any of Claims 1 to 9, characterized in that the multichamber hollow profiles (10, 11, 12, 13, 14, 15, 16) have a wall thickness (d1) of the outer wall (20, 21, 22, 23) of 0.15-1 mm, and preferably of 0.15-0.5 mm.

11. Energy absorber in accordance with any of Claims 1 to 10, characterized in that the multichamber hollow profiles (10, 11, 12, 13, 14, 15, 16) have a wall thickness (d2) of the inner walls (24, 24', 24'') that separate the chambers (25, 25', 25'') of 0.1-3 mm, preferably of 0.1-1 mm, and especially of 0.1-0.5 mm.

12. Energy absorber according to Claim 11, characterized in that multichamber hollow profiles (10, 11, 12, 13, 14, 15, 16) are provided with the same and or different wall thicknesses (d2) of the webs.

13. Energy absorber in accordance with any of Claims 1 to 12, characterized in that the multichamber hollow profiles (10, 11, 12, 13, 14, 15, 16) are joined to each other positively or preferably by soldering, brazing or adhesive bonding.

14. Energy absorber according to Claim 13, characterized in that the multichamber hollow profiles (10, 11, 12, 13, 14, 15, 16) are joined to each other by a thermosetting adhesive (30).

15. Energy absorber in accordance with any of Claims 1 to 14, characterized in that the identical or different multichamber hollow profiles (10, 11, 12, 13, 14, 15, 16) joined positively to each other are oriented relative to each other in

such a way that the longitudinal axes of adjoining multichamber hollow profiles (10, 11, 12, 13, 14, 15, 16) are parallel to each other.

16. Energy absorber in accordance with any of Claims 1 to 14, characterized in that the identical or different multichamber hollow profiles (10, 11, 12, 13, 14, 15, 16) joined positively to each other are oriented relative to each other in such a way that the longitudinal axes of adjoining multichamber hollow profiles (10, 11, 12, 13, 14, 15, 16) are at an angle to each other.

17. Method for producing an energy absorber
-- by extruding multichamber hollow profiles of aluminum or an aluminum alloy with a flat profile in cross section with two parallel broad faces (20, 21) and curved or flat narrow faces (22, 23) and with at least three chambers (25, 25', 25'') extending in the longitudinal direction of the profile;

-- by coating the still-hot multichamber hollow extruded profiles leaving the extruder with joining means (30);

-- by cooling the coated multichamber hollow extruded profiles and then cutting them to the desired lengths of the multichamber hollow profiles (10, 11, 12, 13, 14, 15, 16);

-- by repeating the process for a different profile cross section; and

-- by arranging identical or different multichamber hollow profiles (10, 11, 12, 13, 14, 15, 16) one above the other and joining them together.

18. Method according to Claim 17, characterized in that multichamber hollow extruded profiles are extruded with preformed joining means, which allow the multichamber hollow profiles to be clamped in place in the energy absorber element.

19. Method according to Claim 17 or Claim 18, characterized in that the joining means (30) with which the broad faces (20, 21) of the multichamber hollow extruded profiles are coated is zinc, a brazing mixture, or an adhesive.

20. Method according to Claim 19, characterized in that the adhesive is a thermosetting adhesive.

21. Method according to Claim 19 or Claim 20, characterized in that the multichamber hollow profiles (10, 11, 12, 13, 14, 15, 16) are joined by the action of heat.

22. Method according to Claim 21, characterized in that the multichamber hollow profiles (10, 11, 12, 13, 14, 15, 16) consist of an aluminum alloy that can be artificially aged, such that the artificial aging and the curing of the adhesive to join the multichamber hollow profiles (10, 11, 12, 13, 14, 15, 16) are carried out in a single process step.